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SYSTEMS AND PROCEDURES QUARTERLY

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February 1953

A Desirable Gadget

As we look backward over the past year and cogitate (among other things) over the numerous new gadgets to make office work easier which were introduced during 1952, a wistfulness creeps into our thoughts. Perhaps 1953 will bring us some of the gadgets we still hope to see invented. First on the list is a device something like the "Bell-ago" which was once introduced by Col. Stoopnagle and Bud on their radio comedy show some years ago. When one pressed the "Bell-ago" it rang a bell at the Police Station ten minutes ago. This gadget was especially useful in preventing hold-ups. Sometimes the cops got there before the robbers.

An adaptation of this device for the use of modern industry would work in another manner and would not, at first blush, appear to be so nearly impossible of attainment. The thing we have in mind is a device to make people do ten days ago the things they should have done then but usually don't get around to doing until ten days later. Every office machine salesman, every forms manufacturer, in fact every supplier who serves modern industrial establishments, has probably wished many times that he owned such a device so that he could gently prod his customers with it.

How many rush requests would be avoided if the numerous unnecessary delays leading up to the request were avoided? How many emergencies are created by laxity in anticipating our needs with sufficient lead time to allow them to be filled in a normal routine manner rather than on a "crash" basis? How much do we all pay out in premium costs because our suppliers have to apply extra effort and overtime hours in expediting their deliveries to meet our extraordinary demands?

Truly, a forethought-instiller and delay-eliminator would be a supremely useful tool for business. Impossible of attainment? What do you think? Aren't these things really part of the systems man's daily routine and stock in trade? A system pre-supposes that all factors affecting the ultimate result are given due forethought and consideration. And the elimination of delays is of course the bread and butter of the systems man's daily fare. So at least he's working on that gadget, but we doubt that it will be perfected in 1953.

Shop Orders in Job Shop Operations

By W. E. Staff, Jr.

MANUFACTURING must be planned to align plant facilities with available materials, scheduling machines and man output to meet customer's requirements. This means normal productivity must be accurately established and that control must be operative. Schedules and loads, in a broader sense, help determine what plants are capable of producing, and controls lend every possible effort to help meet or exceed expectancy.

The elements in manufacturing a product either aid or retard production. If we take away one of the factors, let us say "basic labor," production stops. Today, we are worried about greater productivity. With the same number of people or with fewer people (less labor) we must produce as much or perhaps more than we have before. The same number of people (or more people) must produce greater quantities of a product than the same proportionate group ever produced before. Competition will be keen. Labor will request that the prevailing wage scale be maintained. To meet competition, the retail selling prices of products must be lowered. Business must look for its profit through shortening the time between receipt of orders and shipment of products.

How can this be accomplished? By eliminating excess motions, excess operations and excess handling of material, specifications, orders, instructions, reports, information and paper forms.

Business is primarily set-up to make a profit. There are common basic factors involved in all business. The control of these factors will vary according to the size of the company, whether it's a privately controlled company or a corporation; whether standard items or special units are manufactured, whether management is progressive—or defensive. Different systems used by different executives in controlling the operations of their businesses will vary according to the extent to which they wish to maintain control. Many organizations have been forced to install systems of controlling material due to the war in Korea. Many organizations installed complicated systems two, three, or five years ago because they were the best available at that time. Many organizations would like to install and maintain a better control over certain operations—if they could have a simple system which is easy to operate. The simpler the system, the more efficient the operation.

When studying any system or procedure, it is important to get an overall picture of the entire set-up. After analyzing the set-up in its entirety, approach one phase of the system at a time. Bear in mind the fact that a complete system, or any portion thereof, may be set up using properly designed forms, mechanical means of reproducing and proper housing equipment.

In some firms interest may be limited to a machine load record and a master production control. Others will be interested in move tickets; operational drawings or a manufacturing shop order. The overall system under consideration here deals with the basic controls used in a shop order procedure. This type of operation is referred to as job shop operation.

Shop Operations in Manufacturing

There are three types of shop operations: job shop operations, straight line mass operations or parts for stock, and combination job shop and straight line operations.

Job shop operation is involved where a manufacturing concern manufactures any type of product which they have equipment to handle. The products which organizations of this type produce vary from pins and bushings to gun carriages, portable steel bridges, fly wheels, washers and step hangers. Their customers usually expect delivery in a very short time. In general manufacturing you will find job shop operations, where many types of jobs are

ONE of the directions in which Business must look for continuing profits is toward shortening the time between receipt of orders and shipment of products. Efficient administration of shop orders is an important step in this direction.

produced but once. Each job is a special job in production.

There are two ways of operating a job shop: a) Have excess equipment and excess labor, and b) have enough equipment and have sufficient labor to man the equipment.

When a manufacturer operating as a job shop has excess equipment and excess labor, new jobs can be started through the shop without disrupting the schedule of the other jobs in process. The orders are sent to the shop and run through by "rule-of-thumb." Many times it is a case of dispatching work to the foreman and allowing him to control productions to meet customer's requests for delivery.

When a manufacturer operating as a job shop does not have excess equipment and labor, it is necessary that each department and each machine be operated on a schedule basis. To shorten the time between receipt of orders and shipment of products, schedules must be established and controlled.

Straight line mass operation is where you manufacture for stock or for specific quantities for distribution, month after month. The quantities of piece parts or equipment are determined from perpetual inventory records and/or statistical information from sales trends. Usually this type of manufacturer makes the same product year in and year out. The manufacturing data, engineering routing specification, etc., once established remain constant, unless revised to improve products. The volume of a production run of parts or products may vary, but the manufacturing sequence of operations is the same. This is also true where assembly of standard items remains constant.

In this type of operation, it is more profitable for a firm to set up their standard routings, factory instructions, etc., on master plates which can be filed numerically according to piece part or equipment number.

Whenever orders are received to manufacture these items, the plates can be pulled and necessary forms imprinted (shop order writing), such as manufacturing instructions and orders.

In general manufacturing you will find many firms, both large and small operating on a combination basis. The most economical method of manufacture is to set specific equipment in a straight line, and use this equipment to manufacture the same piece part year in and year out. On this basis it is very easy to set up a schedule and control it.

Most large and small organizations will have many different methods where special orders—variable information is issued continually. Controlling, handling, referring to and housing this information is always a problem.

Four Factors in Manufacturing

The following four basic factors are involved in manufacturing any product: materials; machines and/or tools; labor and time. If one of these factors is missing or poorly controlled to coordinate with the others, production stops or is greatly retarded. These four factors are maintained in the shop or factory. It is necessary that the raw material come into the plant and be moved over the machines by labor at specific times.

To what extent and how these factors are used is determined by management through the use of instructions, orders, records, and reports, either verbal or issued on pieces of paper). Most instruction, orders, records and reports are issued on paper forms.

When the front office receives an acceptable order from a customer, it is necessary to place this order on the factory. Management authorizes the shop to manufacture a product. The shop order may be called a manufacturing order, a production order, a manufacturing specification, a sheet order or numerous other names. The purpose of a shop order is to initiate, schedule and control production. Management's job is to coordinate the allocation of materials, machines and tools, labor and time for the performance of a specific task so that they will know the cost of manufacturing the item, and can determine the basis for estimating profit or loss.

Management, like a machine or dynamo, is composed of many parts. Therefore, the technique for operating this dynamo to generate human activities and thus raise the efficiency of the company by raising the performance of the individual is divided into three major parts: *planning methods, performance,* and *control.*

(*Turn to Next Page*)

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Planning, which draws the blueprints for performance, may seem flawless and astute, but it takes production performance to prove the plan. Here is where better results come from better methods, better organization, better instructions, better training and better utilization of time and materials. Correct controls then indicate to management the quality of performance and permit future planning to be based upon facts, so that improvements can be made or a problem solved where an unsatisfactory condition exists.

The function of control is inspection and appraisal. Management is interested in the quality of its planning, the quality of its operating performance and the quality of its personnel. With the proper tools used in the front office systems, management can control and measure the quality factor—profit.

Management is usually in the front office. Executives under management control, coordinate, instruct and supervise these four factors in manufacturing. The more efficiently these factors are controlled, the lower the cost and the greater the profits. Controls must be flexible and easy to operate.

Shop Order Writing

This is not a complicated procedure. The shop order issued to the factory is a duplicate of the customer's order in relation to what the customer orders plus additional instructions to help the factory make or fabricate the part or equipment under specific conditions.

In the writing and issuing of a shop order to manufacture a specific quantity of a specific part for a specific customer, management sets up *Standards* on *How*, *When* and *Where* the part or parts and/or equipment will be made in their shop.

1. The engineering department develops (or selects from their files) and issues a blueprint and instructions with the blueprint number.
2. The engineering department develops (or selects from their files) and issues a routing. The routing shows what steps are to be taken in fabricating the part, and lists the machines on which the part will be made. The engineering department also estimates the amount of time it should take each operator to perform each operation.
3. The shop order writing clerk must write and issue a copy of the shop order for a specific customer to various departments and individuals so that the front office as well as the shop has a record on the job in the shop.

There are many ways of writing shop orders. Again it depends on the amount of control and the basic requirements of the business, which should effect the kind of procedure used in writing shop orders. Examples are: 1) Snap out set "12 part." Both shop order and invoice set. 2) Hand written order—on master. Becomes shop order and invoice. 3) Hand written. Typed—because more description needed—Snap-out. Typed—Invoice—So many shortages. 4) Set up on addressing metal plates—standard data.

Schedules

How are schedules determined? For each new part or piece to be manufactured the engineering and/or estimating departments establish:

a) Routing. A routing specifies the operations to be performed and the sequence of these operations, together with a listing of machines or groups of machines on which these operations should be performed.

b) Standard Time. Estimated running times are established by the engineering and estimating departments, which indicate how long it should take the factory to perform each operation. Usually, time is set up per piece per operation—or per 100 pcs.

Schedules are determined from these standard running times and reference to material on hand, by maintaining a record of the total number of hours ahead of the machines and/or departments—or work in progress and work to be run—the production department can schedule work systematically. By keeping a record on "standard running time," they establish what is called a "machine load" or "department load." By referring to the number of hours of work ahead on specific equipment they are able to establish "due dates" per operation and per delivery on new jobs. Due dates are assigned for initiation and completion of each operation or each product unit. Information for schedules is derived from machine load files, availability of materials, machine capacities, operation sequence. Machine loads provide time basis for route sheets and production schedule.

In general manufacturing there are special orders constantly being issued to various departments covering new information from day to day.

In all manufacturing concerns look for the special orders and variable information being issued. Even though a firm is set up on a straight line production basis, inquire about the variable information being issued, and how it is being controlled, handled and housed.

Where a firm is operating on a job shop basis—most orders are specials. Wherever you can find special orders and new information you can show the practicability of using flexible, visible control files.

Controls Used in Shop Order Writing

On form records (shop order forms) management predetermines the manner of handling orders in the shop by various controls. With these various controls on the shop order (and the duplicate copies of the shop order), management established a complete control over the four factors in the shop.

The types of control or controls used will vary according to the size of the concern, the type of business and

will largely depend, for their effectiveness, on management's foresight in the matter of the need for "good controls" for their operational functions.

Controls may consist of shop order numbers in sequence, blueprint numbers, customer order number, customer's name, established times per operations; routing sequence, operator's clock number, due dates, etc. The information wanted by organizations will vary. The shop order form can be rearranged for various information to suit the prospects' needs and desires.

Some of the forms used in shop order writing controls: manufacturing shop order, job tickets, master production control, machine load, productive material order, move tickets, tool notice, and shipping order.

The key to "good controls" is the speed with which pertinent information can be located when it is desired.

The flexibility of an office system or procedure is most important; progressive business firms are constantly changing to improve their operations. Flexible systems equipment have been designed and developed to meet the demands of modern business functions.

Types of Forms and Instructions

The *manufacturing shop order* is an authorization to use certain materials, tools and/or machines, labor and time to produce specified parts or products, sometimes called production order, or shop traveler order. An additional or duplicate copy is issued for each work center.

a) As a manufacturing shop order, this record is sometimes kept in a dispatch booth, and, from reference to it, jobs are assigned to the workman. The foreman can tell at a glance the status of the jobs in his department.

b) As a production order, this record is sometimes kept in a dispatch booth or time booth and is handed to the operators as they are clocked in and out of jobs. The operators carry it to their machines and back to the time booth. An additional (duplicate) production order is issued for each work center, dispatch booth or time booth.

c) As a shop traveler order, this record may travel with the material from department to department in and out of dispatch booths or time booths.

The *job ticket* is an authorization in writing for an operator to perform a specific operation on a specific quantity of material, involving certain machines and/or tools, within stipulated standard time, and for a given rate of pay. Some organizations call these forms work tickets.

a) As a job ticket there may be one record for each operation. The timekeeper presents one to each operator on each separate operation. These are issued for each operation and, occasionally, two or three for each operation where the job runs for two or three days. The operator takes this ticket to his machine and back to the timekeeper as he starts and finishes a job.

The job ticket can be clocked in and out with the labor ticket and be used as a progress report, and will also serve as a check for the engineering and estimating departments. The job tickets first go to the production department and report the progress of operations, they are then referred to engineering and estimating. Many times the estimating department would like to know the actual time it takes on certain operations to compare with their estimated time. On new jobs starting through the shop, the job ticket gives them a check to make sure that they will show a profit on the job in accordance with their estimates.

The *master production control form* is a master record of information (on one sheet) needed for showing the operational progress of the job through the shop, this record is filed in the production department.

a) These forms can be filed in the production department alphabetically by customer's names and according to due dates.

b) When the job tickets clear the dispatch centers or time booths and flow to the production department, the production clerk draws a black line through the operation on the master production control form which the job ticket refers to—if the job is running on time. A red line is drawn if the job is running behind schedule.

c) These master records give a complete picture of each job in the shop.

d) Delay reports can be taken off very quickly, showing those jobs which are running behind. Delay reports are furnished to the foreman.

Machine load forms

The *machine load forms* should be filed in a visible file in the production department and are used to determine the number of hours ahead of each machine and/or department. These forms help establish schedules. The machine load determines the due dates assigned to each job and establishes the sequence of operational functions.

With an up-to-date machine load, an accurate schedule can be established and deliveries made in accordance with due dates. Some people will maintain that machine load records can never be kept accurately in their shop, due to local condition. Even though they may not be able to maintain the machine load 100 per cent accurately it will give them a valuable guide to use in establishing their schedules.

a) Machine load forms are filed under machine number and/or department number, according to due dates.

b) Total loads are carried forward daily or weekly on the first card in back of machine numbers.

(*Continued on Page 26*)

Application of Electronics to Administrative Systems

By W. B. Worthington

FEW will argue with Mr. Worthington's basic contention that in years to come systems men will find themselves wrestling with problems of electronics applications in administrative control. But in the areas of degree of application, time required for full development, and labor relations aspects, his views are likely to meet with spirited debate.

In any event, the staff is happy to reproduce Bill Worthington's vision of the future in the unique and refreshing style in which it was submitted.

WHAT is Electronics? It's what can be done with ultra-high speed valves for controlling the flow of electrons. Application of these functions to administration of business and government is a field in which leadership is needed, both in factory and office.

We can set our course toward push-button administration, and God willing, we can get there. Our immediate objective can be to keep a simple subject simple, in spite of the differences in interests, backgrounds, and language that tend to confuse it.

Immediately, we can accept the fact that we are on the threshold of a tremendous change in thinking, involving sub-division of most of our operational habits into more elemental units, and five to ten years of re-building these bits into patterns formed of binary decisions.

Language is perhaps the biggest bottleneck at the moment, and with it goes a scarcity of people who can bridge from what is to what can be done. This presentation is an effort to do something about it.

For practical purposes, we can aim at electronics, apply mechanization, and use scientific thinking. For a scope of action, I can suggest men, manuals, and machines, in that order. For an initial text, I can suggest F. W. Taylor's *Scientific Management*, which was published in 1914.

Fundamentally, an electron valve has no moving parts. Therefore, it has no inertia, and can operate at thousands of times the speed of valves, relays, and switches that *do* have moving parts. It can be manufactured at low cost, and can be marketed in standard assemblies. This means that this speed and flexibility can be delivered in low cost units that can be assembled on the job to fit a user's requirements. Best present guess is that this will be around 1960.

These units can be used to replace, supplement, or develop human reflexes in carrying out sequences of operations, such as directing and controlling other machines. These can be in office, plant, or field; and it does not matter whether they are used in business, government, or military operations. The variety of signals that can be

used to trip these valves comes close to matching those shown in a Rube Goldberg cartoon—light, sound, motion, dimension, selection, matching, another valve, and plenty of others.

Application depends first on better knowledge of the sequences of operations involved; second, on development of the right kind of assemblies for delivery in mass; and third, on better bridging between what is needed and what is available. This sounds deceptively simple, and it is. Most major developments are. This development goes deeper. It involves splitting our habits and conscious thinking into the common denominators of binary choices.

At first glance, our reaction is bound to be, what of it? But as we think further into what it means to us, it begins to dawn that we have here something that we'd better master before we find ourselves hopelessly out of step.

What do we have now?

That ominous rumble you sense is the future coming at us. Head men of all times have had a great yen for push-button control of operations, and what's more, will get it; out of somebody's hide if it can't be helped. Desire is great, actual need for integrated administration is greater, and when practical application lifts a competitor ahead of his industry, competition will turn the rush into a stampede.

In operation, we have a few single purpose digital calculators producing marvelous results in computation, which is not a major problem in general business administration. We have some first class scientific thinking being applied to computation, and much business dreaming about push-buttons, without proportionate linkage between the two. (For more complete coverage of these aspects, I can refer you to the December, 1952, issue of *Modern Industry*, which presents an excellent report of who is doing what in this field.)

The background

We have steadily progressing research and application of electronic controls to processes, both industrial and military. (For basic data on electronic controls, ABC's, and terminology, refer to the September issue of *Scientific American*, which is devoted entirely to it.)

We have thought and conversation on future potentials, we have pilot installations, and we have a slightly frenzied effort of manufacturers to get into the field. We also have the concept that the standardization preceding application can be profitable in itself. We have an electronics industry with money and components developed through military, television, radio, and other electronics applications.

We have a cadre of people with varying degrees of familiarity with electronics, from armed services, colleges, and industry. We have 150 years of Jacquard looming, 60 years of punched card development, and a wealth of experience with other types of relay-operated equipment. These have laid a ground work of reproducible experience that can be incorporated into usable electronic application know-how.

We have an office equipment industry that has consistently followed its markets—usually, close behind the needs of its customers, and far ahead of formal business dogma. We have a fairly well defined path to avoid labor-management troubles, in the concept that repetitive routines are for mules and machines, and that electronization of routine frees human beings for fuller development of their individual potentials.

We also have some practical problems at hand that can serve as profitable entry points.

We have a fairly open road ahead for development of electronic programming, we do have potential solutions to problems of random access to large quantities of business information, and we have a liaison problem in getting the dreamers, adapters, producers, and users going in the same direction at the same time.

In short, we have the market, we have the components of solutions, and we have the brain-busting job of putting them together—fast.

What can be done by using electron valves?

Consider ideas, and a means of disseminating them, and a means of activating them. This is a working definition of relationships between words, printing, and electronics. If a line of thinking can be described in detail, it can be printed for carrying out by people. If it can be printed, all or any part of it can be translated into electron valves and circuits that will cause direct action. If we can write it, we can valve it.

The staggering implication is that the potential effect of electronics on human activities is of the order of that wrought by movable type. The changes ahead appear to be similar in character but far beyond those effected by printing. Printing, as you may know, has affected us in other ways besides dissemination of politics, knowledge, and standard practice instructions. It's also a grandfather of most of our present industrial concepts, such as standardization of parts, automatic machines, advertising, special tooling, business forms, and the organized skill of a craft.

Printed forms, instructions, and directives carry the ball for administration. It's no accident that a first objective of an incomer is the printing facility of a business, a government, or a country.

Now we're facing something beyond a set of arts, crafts, and techniques that can use paper to disseminate ideas: we're heading at holiday pace into an era of arts,

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crafts, and techniques that cannot only disseminate thinking, but can cut out both the paper and the inertia of the human intermediary, and proceed direct to implementation of the action itself!

Administrative systems is one field of action. This is already advanced beyond general realization or application, and I've a strong hunch that it's the entry through which electronic development is going to spread heavily into business and military operations, with some astounding effects.

What kind of a problem faces us now?

It takes about five years for Mr. Management to get his feet on the ground in this field of application of electronics to administrative systems. The outer limits are two to ten years, depending on where he starts from. The same is true of each segment or level of his organization, though each one can come along simultaneously with the others, so that the five years can run almost concurrently. Cadres can be transferred from early starting segments.

Time to start is now

The first competitor in each industry to operate in milliseconds, at a fraction of his former overhead, is going to run rings around his competition. There aren't many businesses that can afford to take a chance on giving this fellow a five year lead. Therefore, most of us have to start now, if we haven't started already.

When marketable combinations of equipment start coming, they'll come fast. Remember television? Which leaves us with the facts and logic: system establishment in this field takes at least as long as the five years it takes management to become thoroughly indoctrinated and oriented. Mechanical application of machines to a suitable system can be done in a year by mechanics. But the only proof of the pudding of suitability of a system for mechanization is to mechanize it. This leaves us starting now to mechanize our administrative systems with the best available facsimiles of the electronic administrative systems that we want.

Cheer up. Administrative electronics is interesting, and for every buck your company spends on learning about it, they'll profit a hundred-fold in by-products of that knowledge. It's the first legitimate opportunity I've seen to make a profit from machines that do not yet exist!

These seem to be the salient points of what confronts us. In this presentation, I've tried to present points of entry by which you may approach it, and to outline the character of some of the considerations you will be running into.

Input, storage, programming, computation, and output are the functions that comprise an administrative system. They also comprise an initial sub-division of an approach to organizing the subject of electronics in administrative systems, so that it can be studied. The same applies to electronic computers, office organization and layout, and the human brain itself. I'd like to present samples of how each function can be approached separately; and related subjects that are actually, in most cases, whole fields of research in themselves.

Input

Input is receipt of information into the system. An electronic system can pick it up from direct readings of the objects concerned, from symbol patterns on tapes, film, cards, wire, or printed forms, from another electronic system, or from any other signal perceptible by instruments.

Distance is no barrier to the speed of light, so that the remainder of the system can be housed at transmission limits from the pick-up or scanning device. It's perfectly possible now for a salesman to dial an order from Tucson, Arizona, to a home office in New York, and have a stock-analyzed and redirected set of shipping instructions built on a screen or sheet in the Los Angeles warehouse (El Paso was out of stock).

The dialed data would include customer number, product number, what kind of deal, and date wanted. About four groups of five digit numbers. The rest of the shipping instructions, comprising about 500-1000 characters, would come from storage, perhaps "inputted" years ago; keyed, programmed, computed, and outputted in a fraction of a second to the warehouse that had the stock and could do something about shipping it, now. They'd get it completely written out and understandable to anybody, too—addressed per the customer's own letterhead, and stated in uniform product nomenclature, tested for readability and ready understanding by all concerned.

Comparable methods of input into other types of systems are copies of documents, key stroke transcription, selection of pre-punched cards by product and customer, tape transmission, verbal communication, visual signals, sign language, or any other method of sending and receiving a sensory impression between humans. The closest parallel is the pulling of the cards; that's the only one where a couple of dozen characters would suffice to key the rest of the data, in three selections.

Pick-up of symbols

Bare pick-up of symbols is usually faster by machine than by human; but the customary combination of pick-up with checking for consistency of pattern, discard of irrelevancies, simultaneous selection of related data, and fast translation into emergency action, is usually done better by humans.

Most administrative data-input processes are integral with screening for obvious gaps in pattern, and the related experience that can be brought to the task by the unlimited capacity of a human brain. Human brains are available and portable. Unlimited data storage, complete with instantaneous random access, is neither, yet.

In those cases where the total problem can be encompassed in the machine system, the machine can do OK—as in the case of single problem computation, certain aspects of fire control, and various control processes.

Therefore, in practical application to administrative problems, we're still stuck to incorporate some kind of human screening of incoming data. That's one of the reasons why the salesman was in Arizona. Even after that, mechanism must exist all through the system to throw out odd-ball combinations for human analysis and re-direction.

Input isn't really complete until data is filed away in storage; or in a human, comprehension completes the operation. Similar feedback processes prove both. In a human, input is generally accomplished by reading, listening, or some other process of receiving symbols and translating them into other symbols usable by the particular brain, and none of them are complete until they result in comprehension.

Comprehension can be fast

In a human, comprehension can be awfully fast when the pattern is familiar, and just plain slow when it isn't. The time involved varies with the operating speed of the particular brain, but it varies more with the extent to which the particular brain is organized to receive it, and file it in usable form so that the programming functions of the brain can get at it, re-direct it, and carry it through other processes until it slows down again at the point of output.

Mental operations are part of the problem that must be studied to apply electronics, and they're worth study in any case.

I'm convinced that in clerical and administrative positions, about 60 to 80 per cent of the time paid for gets used in the processes of comprehension; determining and getting data to form file slots for incoming data, then completing comprehension, before the programming, computing, and output functions can operate.

Measurement of mental operation time can be accomplished by comparing the time of going through an administrative routine normally, with the time of repeating the process from a start *after* comprehension has been accomplished. Try it for yourself. Ask such a person to re-compute and copy yesterday's output of work. When finished in two hours, what happened to the other six hours?

The quickest advantage I can see in electronic administrative systems, or other mechanical arrangements, is that once the data is within the system, we do not have a fresh input and output problem at each transfer from sub-system to sub-system within the main system. No comprehension, fumble, and referral!

Once established, data can be programmed from one sequence of operations to another at the speed of light, or at least at that of mechanical relays, rather than through the exceedingly slow and inaccurate methods of verbal and visual comprehension.

Perhaps you've noticed that in discussing this subject, it's apparent that an administrative or clerical employee constitutes a sub-system within an administrative system, complete with two sets of input and output problems—his own, and his boss's. Keep it in mind. It comes up again under programming, and under output.

Storage

We have several basic methods, as follows:

a) *Storage of data in tubes, or in other varieties of memory cells, in the form of "bits" of information.* This works beautifully, with complete random access to any information at the speed of light. The hitch is that it takes something like a billion "bits" to equal the file capacity of one little order department with a dozen file cases. This type of storage is a goal of the future, but at present such a file would fill the Empire State building with tubes and transitions. In cost, it would be something like hiring enough people to memorize the archives of the business.

b) *Moving storage past a scanning device, using magnetic tape, punched tapes, microfilm, etc.* This works OK when utilization of data is in the same sequence as the tape. But for normal business use, such as knowing the customer and selecting only that data which applies to him alone, it is not very workable. It's like running off the warehouse till the item you want comes by; or like reading the entire dictionary to find the one word you want to know.

c) *Moving the scanning device past storage.* This is called random access to large quantities of data, and involves knowing what is wanted and going and getting it directly, without an extensive prior file search. You use this principle when you get a book from the library, a carton of cigarettes in a supermarket, or customer and product punched cards from a tub file. I do not know of usable electronic development of this principle, and suspect that for some time to come, application is likely to depend on filling this gap with existing methods.

Buck Rogers and Rube Goldberg could probably work out a movable scanning device, operating on the edges of files cards, for random access and selection. Pure dreaming calls for a scanning impulse to search a locked file of magnetic tapes and bring the data back out, at the speed of light. Till that time, tub files worked from a standing position provide a tolerable solution to normal business problems of random access.

Programming

For an entry into this phase, look at your own office or plant manual. Select a fairly detailed procedure; then go through it, imagining substitution of an electron valve tube for each "if" that you see. An "if" is the verbal equivalent of a binary choice, and there are so many of

them in prose that most of them just aren't written, but are implied. In any case, they're there.

Go further. Substitute a valve, or set of valves, at each transfer from one operation to another. Cut in a whole imaginary set of valves to perform the operation, then cut it out of the circuit, make the transfer over to the assembly of valves that directs the next operation, and keep going. Diagramming as you go can help. Draw it as you conceive it, rather than in any formal method of charting.

These selections of operations, the sequencing of them, the transfers from one operation to another, and the subsequencing that directs the sub-operations within an operation, constitute programming. The rule remains—if you can write it, you can valve it.

The gimmick in the problem, as you'll readily find out, is the "you" part. This is the roughest sort of mental exercise, and no surprise is in order if you fire and fall back, or become indignant at the very suggestion of looking at your own procedures from this point of view.

You'll learn as you go

But relax. Easy does it. Each time you fire and fall back, some spark remains, your subconscious supplies some missing data, and the next time you try, you get a little further. It's a long road, with many steps, and the chances are that the first and biggest step most of us have to take is acceptance of the fact that we "don't know from nothing."

Manuals contain organization, policy, and procedure. A great deal of their content is standard practice instruction, set up to guide and teach the sequences of operations inherent in an administrative system, in any part of it, or in any other pattern of organized activity. What we do in applying electronics is write these manuals in electron valves and circuits that go further than presenting instructions to be read, comprehended, and acted upon. They trigger and guide and control the action itself. This is nothing new. Guide rails, jigs, fixtures, templates, dial telephone exchanges, and built-in calculation sequences all perform the same function. Common examples in administration are the set up slides, plugboards, used in directing the operations of a punched card machine. They constitute standard practice instructions to a machine that cannot do otherwise than follow them. In a reasonably complete punched card installation, the set up boards carry the load of instruction, and the written manual shrinks to memos of which board follows which, and who is responsible for what.

The same function has been served in static situations by building skills and habits into people. Printed forms serve the same ends. So do road signs, lane separators, and intersection lights. Each has its place, and our job is to find the place of electron valves and get them to work before too many other people beat us to it.

However, something new has been added. It's the degree to which electron valves can replace supervisory functions: it's the degree to which they can replace skills like typing, which itself replaced hand scribing: and it's the degree to which we can skip the printed word and go direct from concept to establishment of action patterns.

Right here we have a terrific contradiction, psychologically, that can bring some people to a grinding halt on the whole problem. To eliminate words, we have to use words to define the problem! So that the man crafting the words outlining the new process suddenly feels unease with the horrible realization that he may be scribbling his own profession to oblivion! This particular facet is more amusing than confusing, as it is reasonably certain that the horse will be replaced. Still, similar reactions, stirring namelessly in our man's mind, may underlie a good many of the emotional outbursts sure to be encountered in application to administration.

Programming, in itself, is probably the first facet of administration that will receive wide-spread electronic application; that is, after process control and communication, which are already with us. Remember those sub-systems? Anywhere that input-output between subsystems can be put into the form of direct electronic programming of the same data, we drop about 80 per cent of the time that we are paying for, before we ever start to figure whether the operation itself rests more or less!

Again, if we can combine two sub-systems so that they operate from the same stored data, we get the same effect. In terms of staffing this means that if we can get two sequences of operations from one sequence of comprehension, we drop about 40 per cent of the hours involved. Or as it usually happens; we load both sequences onto one of the two people who has had to comprehend it, absorb the extra load by various means that make comprehension easier or more quickly filed, and assign the other person to separate duties. After all, 80 per cent of his work vanished when he got out of the necessity of comprehending the sequence!

Applications galore!

The same sort of thing can be worked out between human and machine, whether office or plant. I can imagine a somewhat bulky console being wheeled up to an existing machine, to operate it so that instead of requiring constant attention, it requires only a stripped down input—something like our salesman, who dialed four numbers instead of writing out a whole order.

Applications exist galore in running plant machines, accounting machines, and card punching machines. Such gismos would be feasible economically if they replaced the time of one person out of three, or in the average office, if they got the job done right and on time, without replacing anybody.

Such arrangements would be strictly interim affairs, perhaps, but we have to start somewhere. The final

product will be more like the internal programming of our present digital computers—operating directly from sub-system to sub-system from the same data, without all sorts of interposed levers, gadgets, keys, and people.

Input-output is expensive at any level, and it shows when we program from one sequence of operations to another without it. And I wonder—did you find a hint somewhere here on how study of programming can be profitable without ever having a machine to install?

Computation

So much has been written of the Superman speeds of digital computation that it doesn't seem necessary to dwell on it. It consists of electron valve arrangements that duplicate the common arithmetical operations of add, subtract, multiply, divide, and round off to significant digits. Combine these with single-problem programming and input, and the net effect justifies John Coleman's story of the Indian's description of ski-ing: "Climb mountain, WHOOSH, walk back ten miles. ."

This refers to weeks of setting up a problem, hours and hours of pouring the data into the machine at a measly 5,000,000 digits an hour, then a few seconds of computation at the speed of light, and WHOOSH! here's the answer, and we can start the ten miles of setting up the next problem. This applies to the big electronic computers, frequently called "electronic brains," though they resemble a real brain to the extent that a skeleton can be said to approximate Lana Turner.

For business purposes, our best bet is to tag "Q.E.D." on computation, and pitch it in the "Solved" file until needed. The "whoosh" doesn't apply, mainly because business problems, once established, remain fairly constant. Both information in storage and the sequences involved in programming remain fairly constant during any one year, and shift only slowly as the pattern of the business evolves.

Customers stay fixed, reasonably; products can be described the same way year after year; and if the sequences of procedure didn't stay put, we couldn't manualize them, nor could people run year after year on the same sets of habits. Sure, we have change: it's the only real constant in business, and it keeps us hopping to keep our manuals up to date. And in a fully push button administrative set up, it would keep a couple of maintenance men busy.

Limited computation is needed, and it's available in many forms. One good one that can be tied into existing punched card set ups is IBM's 604 multiplier, at the approximate price of a medium grade management employee. The renter of this gimmick gets his money's worth in electronic education, flexibility for handling computations, and capacity to handle any problem he can set up and feed into it.

Remington Rand's Univac is an approach from the other end. It's an administrative system in itself, with the complete set of functions—input, storage, programming, computation, and output. It can handle certain types of business problems in their entirety.

The title of this section is computation, which differs from computers, or digital calculators, in that the big calculators cover the entire range of office functions, but not in the proportion, or at the cost, that they exist in business. "Computation" includes a comptometer, if it can be teamed with electronics to make a workable system. Still, problems do exist that are in the range of the big calculators. I can visualize that an overseas logistics problem, involving a few million to a few hundred million dollars of supply, can readily justify its cost, if just once it predetermines the end effect of a policy in time to switch to an alternate policy before pressure makes it necessary to get something into operation.

Market research, actuarial tables, and other look-ahead mathematical calculations can justify the money involved. A number of companies can set up digital calculators, and this is one type of electronic installation that can be bought, rather than sweated in. All it takes is the suitable problem and the hundred thousand to a million dollars needed to set it up.

Analog computation is another subject, operating more on the principle of a slide rule. Don't overlook it, because administrative control is heading toward analog methods, and it shouldn't be too long before we're in it. The next section, output, is somewhat relevant to consideration of analog computation. However, for now it will suffice to have a clear idea of the differences between digital computation, analog computation, and those behemoths known as electronic brains.

Output

For business purposes, *printed* output isn't much of a problem, though output itself is the entry through which we can tap the major field that electronics opens to us. If we can get the right data set up in the machines, and if we can program our administrative routines, then existing computation equipment will handle computation at a reasonable price, and we can nearly always work out some satisfactory method of printing whatever output it's necessary to print, forms and all.

We've had equipment in the printing field for 500 years, and we've had specialized office printing for better than 50 years. What's more, some present developments will pick off bits of information from memory storage cells, and put it on paper at 15,000 characters per minute, or perhaps it's per second; at that speed, the limiting factor seems to be the speed of feed for the paper.

The familiar printing head of a punched card machine will produce close to a million characters an hour, which is the equivalent of a complete edition of Shakespeare. Or we can bring it out of our system as microfilm, punched tape, punched cards, magnetic tape, or any other standard

means of recording alphabetic and numeric characters. But recording the answers doesn't seem to be an end in itself. I prefer to look at an entirely different destination for output—the operations that the figures concern!

It is all very well to print an accounting report, which shows that something ought to be done about so-and-so. It is better if the same set of answers goes direct to so-and-so and does what ought to be done, without ever going through the intermediate stage of paper comprehension, fumble, and referral through the chain of command until it eventually, maybe, results in direction of action—we hope. Writing an order is OK, but sending the data directly to the warehouse and pulsing the gimmicks that ship the goods is better. A sheaf of reports for the boss is fine, too. But what's wrong with a set of televised graphs, installed in his office, with a constantly visible picture of the business? Something like the combat information center on a Navy ship?

Pulling a set of nicely calculated data for production is good, but why not pipe it direct to the shop in the form of program, schedule, and instructions that guide the gimmick that produces the part? Or a stock position: it's good to have a signal that we need to re-order, but what's holding the machine from carrying on till the order is in the mail? Or better still, dialing it to the vendor? Or one step further—what's wrong with traveling via the telephone dial system right into the input of *his* administrative system?

I mention these points with such heavy emphasis because business thinking has a habit of stopping dead, with a dull klunk, at departmental lines. An accountant produces reports, and is inclined to aim all his procedures at reports. From the boss's point of view, the big purpose of a report is to direct the business, and if data can get into re-direction of operations reported, in milliseconds instead of months, that's ideal. Why make reports? Maybe bleed a few samplings of digital data for the income tax man, but that's about all that is really necessary of our present paper blitz.

If the matter is a little more abstract, or hasn't been worked into directing types of electronic control, then let it ring a bell in the office of the proper supervisory level, flash a light or two, and limn the details on a screen.

I suggest that you kick this around a lot. The object is to attain really competent direction of the enterprise. It helps to get rid of the output and input from sub-system to sub-system. If in the process we accomplish stripping the bottom layer off the organization chart of administration, then we've probably gotten rid of four-fifths of the bodies, three-quarters of the cost of overhead, nine-tenths of the delays, and an unknown proportion of the disorganized chaos we'd like to convert at least as far as organized confusion.

This approach is beginning to be developed in process control, and in military missiles. Input comes from some type of signal, such as a measurement of dimension or a radar return. It then programs against stored data, computes a variance, and outputs directly into re-direction of action. It's one of the big things we want from administrative systems, and it looks like we may get it through electronics.

The second thing we want from an administrative system is an outline of the size, character, and imminence of the problems that haven't already been solved, so that we can get human brains to work on them, fast. And the third thing we want is a record of what happened: for experience in planning future operations, for defending ourselves to the stock holders or voters, and for computing tax and dividend payments. What else?

Down deep, I guess we all want to be bosses—to be released from some of the ulcer-breeding contradictions, to use our own brains in widening our own horizons, to render better and more satisfying service—in short, to grow as human beings. Some persons *do* prefer to trod the mill in endless escape, but the basic urge of those who shape tomorrow is that repetitive routines are for mules and machines, particularly on their own jobs.

So we all want to be generals? So what? If we can dream up a machine that will do our dull job in 20 minutes of button punching—why not, pray? A better job for less money, quicker done, and more time with the family—what's wrong with that? Some see a chance for personal advancement, depending upon approval of their superiors to advance their station in life.

The main problem

Some see a chance to solve the big and really murderous problem of communication in industry. Fewer human outputs and inputs, and a fair chance of stripping the bottom layer from our unwieldy administrative structures. It's needed, too. Rome in all its glory was a local sideshow compared to the size, complexity, and geography involved in some of our present organizations. The big central problem here is control, and there's chance that electronics will aid our solutions.

Some look at manning tables of our armed services, at our industry, and at the Russians. Some feverish figuring comes up that our comparatively few people have to be multiplied wholesale by mechanization, wholesale. There's plenty of common sense in that view. I commend it to you. But if you have trouble translating these general motives into personal motivation, let's look at a negative side.

What happens to the felicity and comfort of our business lives if our board of directors finds that our principal competitor is suddenly doing business in milliseconds instead of weeks, like we're still doing? What happens if his lower overhead, one-tenth of ours, reflects in a price cut or in service that we can't meet and make a profit?

Just . . . what happens?

A Systems Man's View of What Management Really Wants

By John W. Haslett

THOSE who attended the 1951 National Systems Meeting of SPA will remember that Wayne Marks, vice president and controller of General Foods Corporation, gave us his expectations of what a systems man should do to carry out his functions properly. That viewpoint, of course, came from the upper reaches of management. This evening, we will have a look at the other side of the coin. I shall take the same topic from the systems specialist's point of view and look at it in terms of the various types of management demands upon the systems and procedures function.

What top management seeks with the organization and methods specialist depends upon the type of management that is involved. Just as there is an infinite variety of individuals in this world so there are many varieties of management with greatly different viewpoints. For our present purposes, however, let us divide management types into three groups—fashionable, unenlightened and enlightened—and examine the apparent ingredients of each.

First the fashionable. The most observable characteristic of the fashionable type is that it wants to have a systems man or systems department because it is the thing to do. With more and more companies recognizing the need for the methods function, there are those which set it up merely to go along with the trend. The fashionable type of management looks around its organization and designates some department, usually in the controller's office, as the methods department. Now perhaps this department is already burdened with routine recurring functions of an accounting nature but that does not make any difference. It is thereafter designated as the methods department but it does not do real methods work because it has not the time to do so. It is so involved in day-to-day activities that long range planning, for example, can never be accomplished. The only problems it is inclined to tackle are projects of a limited scope, dealing with the immediate routine of the office. As nothing more than an offshoot of a department dealing with recurring daily and monthly repetitive work, this group is not equipped either by training or by inclination to do a methods job. Nevertheless, its management boasts that it has a systems department.

Next is the unenlightened type of management. Under it a systems department is set up all right and charged with the usual functions. It reviews clerical work, designs forms, sets standards for office equipment and makes organization studies, but it is a hand-to-mouth type of operation because the management does not know how this type of work should be accomplished. There is no systematic approach; it is a brush-fire approach. The methods department is not allowed to develop its own programs and projects, but assignments stream out of the front office like bullets out of a tommy-gun. Miracles are expected of the department and despite all the good intentions in the world, the department never gets around to planning its objectives on a long range basis because it is never given time to do so. Management is breathing down its neck and demanding results where few results are possible in an atmosphere of this sort.

The other type of management—enlightened management—is the dream of all of us. Under the aegis of enlightened management, the atmosphere is entirely different than it is under the other types which I have just described. Enlightened management believes in laissez-faire, or hands off, so long as the procedures people are doing a good job. This management will of course expect results and may even be a hard taskmaster, yet it recognizes the technical nature of the work and the fact that it must be removed from the hurly-burly of daily routines. The department is allowed to exercise its abilities in a proper manner. It is encouraged to do its own program

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and project planning and it is given support in all of its dealings with other segments of the company organization. Results are not expected overnight, the brush fires are kept to a minimum and the department is allowed to blossom to the benefit of its management.

Now there you have three types of management; each is different from the other as the night to the day. The most usual circumstance, however, is to find in any one type of management certain qualities of all three types. In actual practice the elements are present but one predominates. If enlightenment predominates, the systems department is lucky and it can live with some flavor of high fashion and unenlightenment. In fact, it is the systems man's job to lead his management toward enlightenment in the objectives and techniques of his work. A lack of enlightenment on the part of his management is a challenge to the procedures specialist. How to meet this challenge is the question. There is no better way toward a solution than by commencing to study your boss. What are his likes and dislikes? What are his prejudices? All of these must be analyzed objectively since, as individuals, company officials are subject to the same range of appeals which motivate all human actions. Frank Rowland, executive secretary, Life Office Management Association, a few years ago made the following astute observation:

Study likes, dislikes

"Subtleties in personal likes and dislikes should be studied and capitalized as they are often the deciding influence in motivating action. I know of one well-developed program of job classification turned down by the president because it implied a salary downgrading of his secretary. A smart office manager would have 'promoted' her to administrative assistant and all would have been well. A master salesman will have a catalog of his clients' likes and dislikes and prepares his presentation accordingly. By the same token, the staff man should know his chiefs—what appeals to them and what should be avoided."

Of course the approach to top management is sometimes complicated by what I like to call "multiple bossism." This condition exists in many companies, particularly where the methods department has not been granted its full stature in the organization. In this circumstance, the systems man is obliged to fit his presentation to more than one set of attitudes as he rises through the managerial layers. Many of you I know have been faced with a dilemma of this sort and through your own ingenuity have managed the situation with success. As an advisor to top management, the systems man who has met the challenge to assist in creating enlightened attitudes, is at once free to exercise his professional talents.

In meeting the challenge, he must realize that evolutionary influences have been at work for many years and are still at work upon the systems function itself. In fact, the evolutionary cycle may be observed in the development of the systems function in a typical enterprise which has grown from a small company to one of medium size or large proportions. The cycle may be considered in terms of eight phases.

The first phase occurs when the growth of an enterprise brings about the need for administrative planning and control. For present purposes, administrative planning and control may be considered to involve non-routine problems of forward thinking as opposed to the routine and recurring judgments regularly exercised by all levels of management. These may be, but are not necessarily, limited to organization and procedures planning and control.

Phase two occurs when recognition is given to the need for administrative planning after conditions of growth have brought it about. At this point, usually starting with top management, each managerial level assumes the planning and control function as part of its normal administrative duties. Procedures planning and forward thinking on organizational problems form a basis on which future problems may be anticipated before they occur and solutions to these problems devised to be ready for use at the appropriate moment.

As the enterprise continues to grow, organization and procedures problems become more numerous and complex, with a consequent increase in the pressure upon operating levels of management to spend more and more time upon them. As is so often the case, the results which have been obtained from work in this field, combined with the diminishing availability of time on the part of operating supervisors and managers, indicate the desirability of full-time specialists being designated to assist all levels of management in the field of administrative planning and control. The need to abandon part-time planning in favor of full-time planning is phase three of the cycle.

Special staff needed

Phase four comes into being with the establishment of a special staff within the organization to carry out these functions on a formally organized and systematic basis. The location of the special staff, which may consist of one or more individuals, depends in the main upon where the problems are concentrated in an organization or where the function may be most easily directed. In the largest organizations it is sometimes considered preferable to set up the special staff on a decentralized basis, retaining only over-all coordination at the central level.

Once the staff is organized, it enters the fifth phase which is the development of the organized approach. This is customarily called the development of programs, or major work objectives, in the field of administrative management.

The sixth phase of the evolutionary cycle of the systems function consists of the special staff putting into effect

(*Continued on Page 25*)

Policy Formulation

By John B. Joynt

"MANY organizations have sound policies and procedures. Because of their foresight they are in a very fortunate position. Other organizations almost disregard policy and procedures. They pass it off as a new fangled idea. They get by without it, so why bother. . . . As systems men we may have our fingers crossed."

(Concluding installment)

In the first part of this presentation, we discussed the characteristics of policy, and its classification in the corporate structure; its significance and close relationship to procedure; and the extreme importance of participation in policy formulation by staff and line units of the organization. We now take up the four remaining parts of this discussion.

Preparation, Coordination and Distribution of Policy Statements

There is no one best pattern for preparing and distributing policy statements. Normally, the same pattern will apply to both policy and procedure. Each organization must develop its own plan so that it fully satisfies its own requirements. It is important that the policy be reduced to writing and be made available to all concerned. Some companies have a basic manual covering all corporate policy, and a series of individual manuals which cover both departmental or operating policy and procedures relative to particular functions, such as industrial relations, purchasing, etc. In some instances the basic corporate policy is also included in these functional manuals. This may result in slight duplication, but this is not serious because the basic policy statements are broad and seldom revised.

Preparation of a complete manual, either a basic policy manual or a policy and procedure manual covering a particular function is a time-consuming undertaking. Frequently, therefore, the basic policy manual as well as the various functional manuals are built up through the issuance of individual policy and procedure statements covering a particular function such as training. Such administrative communications may be called policy and procedure circulars, regulations, etc. What they are called is not important. The advantage of the individual circular or regulation approach is that certain aspects can be reduced to writing and put into effect as soon as conclusions are reached, and at some later date all such administrative communications may be rescinded through the issuance of permanent manuals. This, however, should not be postponed too long.

(Turn to Next Page)

One of the most important areas in policy developments, for example, is the field of personnel and industrial relations. To completely cover this area normally requires three types of policy and procedure manuals, all of which are closely related:

1. Industrial relations policy and procedure manual covers the basic personnel policies and related procedures.
2. Supervisor's handbook gives the supervisor or foreman the particular policies and procedures he needs.
3. Employees' handbook gives to the employees those policies of interest to him.

Preparation of policy and procedure manuals is a responsibility of the systems and procedures man. Such an individual may be located organizationally in the department responsible for the policy and procedure or in a separate systems unit.

Some organizations require all policy statements to be reviewed by a central staff unit in advance of their release. Others review them at some central point after release both for information purposes and to insure that they are properly coordinated. Still others require no review or organized approach to insure coordination. Review before release is the most effective method of control. The post-release review has the advantage of decentralization of authority and responsibility yet insures coordination and control on a post audit basis. Failure to review or coordinate policy statements is a dangerous practice. Where several organization units are affected, the final review and approval will normally be above the organization level of the several organizational units affected.

Complex process undesirable

Coordination is important, but the process should not be so complex as to delay the formulation of policy. When the formal process becomes too complex there is a natural tendency to by-pass entirely the established channels and to resort to bootleg tactics. Obviously this should be avoided. The concurrence process should be fixed and limited to those individual approvals actually needed. It should help, not hinder, the process of policy formulation. Because of the close relationship between policy and procedure the same concurrence policy will apply to procedure establishment. Furthermore, it is desirable to consider both policy and procedure at the same time.

If basic corporate policy is a reflection of the management philosophy and considered judgment of the board of directors or the company's management, such policy statements should be issued over the signature of the chief executive. This does not preclude the issuance of departmental or divisional policy by the head of such organizational units. But it is essential that there be no conflicts in fact or in spirit with the basic corporate policy. It is important that the process of coordination be completed before the statement is submitted to the approving official.

If policy statements are to become the basis upon which action is taken, their distribution should be broad, not limited. Policy manuals and statements should be distributed to all organization units concerned with the particular policy. Because of the nature of the policy statements, some will be distributed on a company wide basis whereas others may be given a limited or special distribution. Policy manuals will normally be developed in loose-leaf form to facilitate their revision.

Policy manuals to be authentic should be maintained on a current basis. Some organizations issue changes in the form of circular or other media at the time the policy change is decided, and at frequent intervals revise the policy manual and rescind the circulars. This has the advantage of permitting changes to be made quickly—even verbally when necessary. Other organizations revise the entire policy manual to cover a series of changes.

Application of Policy

As mentioned above, it is important that the individuals concerned understand the policy and the underlying reason why it was adopted. Acceptance will be enhanced if the individuals concerned participate in its development. If the policy affects every individual in the company, it would not be practicable to consult with everyone short of an attitude survey. If they are affected, nevertheless, they should be familiar with the policy and the reasons for it. Introduction should be the responsibility of the line official with the aid of the staff official if his services are needed. Such orientation conferences as may be necessary should be arranged to insure that the policy is thoroughly understood. If the official introducing the policy does not know all the answers, it is his responsibility to find out, and in turn communicate the proper information to his people. Some companies issue information bulletins to all personnel explaining policies having broad application.

The application of policy may vary somewhat depending on circumstances, but such variations should not be inconsistent with the intent and spirit of the basic policy. Deviation from policy should be made when there are justifiable reasons, but these exceptions should be limited. If there are frequent variations the basic policies should be reviewed to determine if they are workable. After all, one of the underlying reasons for policy is uniformity.

Neither acceptance nor the effectiveness of policy can be taken for granted. There must be an organized follow-through to insure that the policies are sound and to make such modifications and revisions as are frequently necessary under the test of actual operating conditions. Line officials who are carrying out company policy should not sit back and take the position that their only job is to follow instructions established by higher authority. They are a very strong and important part of the management team

and it is their responsibility to communicate up the line those things that in their opinion are in the best interests of the company. Frequently, they fail to do this because they fear they will have their ears pinned back.

Solicitation of new ideas is a responsibility of the chief executive working through his key line and staff subordinates. It is his responsibility to see that team work and two-way communication becomes a reality, and not just another management expression. Freedom of communication and encouragement of suggestions should be a foremost policy in itself.

Why Firms Fail to Develop Policy Statements

Some managements prefer to look at each case or situation individually as it comes up because they fear that their predetermined opinions might not be tailored to fit individual circumstances. If policy is established broadly and with sufficient delegation of authority to act within the intent of such policy, this will not occur.

Sometimes policy is not reduced to writing because it will be necessary for management as well as the others to live up to the policy. This has the effect of perpetuating certain group distinctions within an organization which are contrary to our democratic principles of management. One of the best ways to insure compliance with any policy is for the president and his key subordinates to set the example.

One method of checking on compliance is through an internal audit. Most internal audit programs, however, check on those phases of the business which have financial implications. Over all check as to the effectiveness of policy as well as compliance may be accomplished through a "management audit." Such audits are being conducted more and more. Both company audit staffs and outside consulting firms are used for this purpose.

At Enka, we have not yet undertaken a management audit program. We plan to conduct such audits, however, on a participating basis with each department head assisting. Under this approach they will participate in determining the appraisal factors as well as an evaluation of the effectiveness of departmental operations in the light of such factors. We plan such audits after our policies and procedures have been reduced to writing and installed.

In addition to the internal management audit, it is desirable to have an outside audit by a highly qualified firm approximately every three or four years. But this is not recommended until the company itself has completed those improvement steps which it deems desirable. A management audit is not only an excellent technique to insure compliance with policy and policy improvement, but it also keeps management on its toes.

Some managements are afraid of their own policies. They fear that they are not sound. They lack courage to have particular policies thoroughly scrutinized as it might expose weakness. For this reason, they sit back and delay any attempt to thoroughly study and reduce their policies to writing. This attitude in itself reflects a definite need for careful policy consideration.

Policy determination is a tough assignment. Even though actual policy statements may be drafted by members of the supervisory staff, it requires management effort. Policy formulation is not a quick job. It must be a cautious and deliberate undertaking. An organization must not rush into new policy without giving those individuals concerned an opportunity to study and make a contribution to the policy, and to consider its full effects. Delaying such a task is easy. Sometimes the delay stems from management not being able to reach conclusions. But the analysis and formulation of policy should not be deferred indefinitely. Instead it should be approached in a careful manner.

Some organizations feel that they are too successful to spend time on policy formulation. Because of huge profits they sit back and take it easy. Complacency can be the cancer of business. The unfortunate thing is that complacency in many companies exists at very high levels—even with some boards of directors. Sometimes it requires a crisis of some character to jolt such individuals out of their complacent attitude. Well managed organizations are constantly seeking ways to improve. The record growth of professional management associations is an indication that management complacency is declining.

A uniform policy for all

Some organizations defer policy formulation because it is too difficult to develop a policy to fit several departments or divisions. If department and division heads participate in policy development, it will be possible to determine whether a uniform policy is practicable or not. Basic policies are normally broad enough to apply to all organizational elements. Sometimes it is necessary to vary the procedures because of different circumstances. But policy must above all be practicable, attainable and acceptable. Variation among different departments or divisions is sometimes desirable. But we should not accept, without thorough examination, the assumption that all departments and divisions are different and should be given complete autonomy without any guidance or control by the chief executive who assumes overall responsibility for all phases of the business. On the contrary, we should assume that an entire organization can function under a uniform policy and we should justify deviation.

Some people have the erroneous concept that to reduce policy to writing places an individual in a strait-jacket; that he is then deprived of the opportunity to think things through and develop a solution of his own. They also advance the argument that they want their department and division heads to have complete authority, be entirely

autonomous and in no way be restricted by written policy.

In answer to the argument that written policy restricts or stifles initiative, I say the opposite is true. Like proper organization, good policies give an executive a framework within which to apply his initiative—it gives him a basis on which to act. Too often the lack of definite policy prevents persons from assuming initiative for fear that some unwritten law or practice forbids it. Policy may often mark the "No Parking" spots but it also clears the places where parking is permitted.

With policy definitely determined and authority and responsibility fixed, an individual is free to make decisions. This eliminates entirely doubt as to who is responsible and it provides the criteria for taking action.

What Makes Policy Effective

Since policy establishes the framework within which the day to day functions of an organization may be carried out, it should be based on principle, not expediency. Policy should be a statement of attitude, perspective and objectives which govern repetitive operations. Basic policy statements should be so broad as to require only infrequent revision. They should be written in language which will not be misinterpreted. Policy may be established by formalization of past practices, but such practices should be thoroughly scrutinized to insure that they are sound before they are accepted as policy.

In a small organization decisions may be carried out on an informal basis. The top man may even know all the people in the organization by their first names. But where an organization grows in size, and the problems of administration become more complex there is need for a more formalized approach. Certainly many corporations and nearly every department in the Federal Government have reached this position. If we accept policy formulation as a basis for sound management it logically follows that policy should be carefully considered and not based on "off the cuff" opinions. To accomplish this, it must not only be given proper thought but it must be reduced to writing. Furthermore, this is the most effective way to crystallize one's thinking. It subjects policy to a more thorough analysis than otherwise. Written statements provide a basis for:

1. Discussion, clarification and crystallization of individual and group thinking.
2. Common undertaking, uniform interpretation and consistent application as to intent and purpose of policy, in the absence of which different executives may handle the same thing differently. In assigning responsibilities and delegating authority it is sometimes desirable to fix responsibility for interpretation of policy with officials within their assigned area of responsibility.
3. Reconciling differences in attitudes and opinions. Frequently executives may change their attitudes or opinions under the impact of certain circumstances rather than on the basis of valued judgment. Sometimes this is justifiable, but frequently it represents an unpredictable individual who blows hot and cold as each new decision is made.
4. Communication of management philosophy, intent and purpose.
5. Review and revision of policy in the light of changing conditions. Policy changes with time and new circumstances. Policy should be a living thing and not an infallible rule for all time.
6. Coordination and control policy.
7. Correction of unwarranted and undesirable practice.
8. Improvement in morale through participation and knowledge that sound practices exist.
9. Basis for developing work programs to carry out major projects.
10. Development of written procedures by which policy may be made effective. This is one of the most important reasons, as policy by itself is frequently not effective without procedures to carry it out. One of the best approaches to the analysis of policy is to analyze the procedures. By charting the flow of all the forms and the action taken on each copy, policy and procedure may be studied and improved at the same time. Experience in organizations with good systems and procedures departments indicates this to be the most desirable approach.
11. Consistency—no one can remember everything. The engineer, for example, has a handbook—he can't remember everything either but he knows where he can put his finger on engineering data; the same applies to policy.

Policy must not only be fair and just, but it must seem fair and just to the individuals affected. To accomplish this, there must be a thorough understanding of the policy. To reach such an understanding it is frequently necessary to have a knowledge of the underlying reasons which prompted the adoption of the policy. Participation in policy development by the individuals concerned provides a basis for such understanding as well as acceptance.

Policy should be a reflection of corporate character. It should represent an opportunity to display integrity of purpose—down-to-earth logic. If policy is to provide a basis for which day-to-day practices of the business may be carried out, it must be easy to apply.

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Tackling the Human Problem in Systems Work

By Harry N. Kamph

IN the first installment of this paper, Mr. Kamph pointed to the microscopically thin development of industrial, accounting and systems techniques when compared with the "massive body of basic human instinct" which has been developing through the ages. He showed that the successful systems man is a psychologist as well as an accountant or time study expert. Mr. Kamph, in this concluding installment, makes some further observations in the field of industrial psychology and cites some case histories.

(Concluding installment)

WHILE the internal systems man is usually not asked to qualify line supervision, except in cases of lack of cooperation, the outside consultant may often be called upon to change, screen, select or train operational supervision. A couple of case examples may be of interest. Some years ago, I was called in by the manager of a medium-sized manufacturing business because he had an uneasy feeling about his office manager, and was not getting timely or adequate financial and cost information. A preliminary evaluation of both the office manager and the system revealed these facts:

1. The man had academic but no particularly practical knowledge of either accounting or systems design.
2. The accounting and cost records were several months behind.
3. The cost records were of an elementary nature, not subject to accuracy control and not supported by good labor or material cost detail.
4. The office manager appeared to be a highly temperamental individual, quick to find fault with all except himself, and was especially resentful of his top management.

It was my recommendation that the office manager be replaced by a more experienced and personally well-adjusted man. In doing this, I gave the employer the facts.

The employer followed my recommendation and made an early change. The new office manager, with but little guidance on my part, instituted a new chart of general ledger accounts and a new mechanical procedure for keeping job costs and other records. At the end of the second month, he was presenting complete financial and cost statements by the 10th of the succeeding period. He is likewise enjoying the cooperation of both office and shop personnel.

In a second case, a major systems change was decided upon prior to my arrival on the scene. At the same time, the preceding controller was relieved of his job and was succeeded by a man who had been general ledger book-

keeper for many years. Naturally, there was some question as to the ability of the new supervisor to carry on successfully, particularly during a difficult installation period. The personnel was turning over rapidly, new procedures had to be installed quickly to avoid bottlenecks, and here we were faced with a man who had no experience at all in managing an office.

Nevertheless, there was something about him which I liked and which showed strength of character. He had a good smile, a fine sense of humor, sufficient accounting knowledge, and the loyalty exemplified by years on the same job. When I discovered that he had also been a Major in the army, I was convinced that we could make the installation successfully, since he had evidently the necessary intelligence and leadership. These facts were impressed upon him:

1. He must accept full responsibility for hiring, directing the efforts of and terminating his employees. (With respect to personnel, prior accounting supervisors had received some interference from top management; where this occurs, the authority and effectiveness of the line supervisor is bound to deteriorate.)
2. He must relieve himself of most of his detail work and direct all of his efforts to assigning work to others, to answering questions with respect to those assignments and to making sure that they are being executed according to plan.
3. He must make sure that daily, monthly and other periodic reports be accomplished for management on an accurate, instructive and timely basis.
4. He must constantly project in his mind the needs of management to more effectively control and operate the business on a profitable basis. As long as he maintained that attitude, he was certain to find ways of improving his procedures, of controlling the costs of doing business and of enhancing the usefulness and content of financial and statistical reports.

This man successfully adapted himself to his new responsibilities and is functioning adequately today on that job.

It is perhaps high time to define or enumerate the basic drives which are inherent in man. These are as applicable to the systems man, the chief executive, and the line supervisor as they are to the operating employee whom we are discussing at this moment.

Douglas Lynch in *Leading and Managing Men*, summarizes these basic drives as follows:

"To satisfy the so-called biological necessities: food, drink, rest, sexual requirements—the instincts of self-preservation and for the perpetuation of the species.

"To be with his fellows, to seek them out and to be one of a group—the desire to be gregarious.

"To have the esteem of his fellows, to be appreciated, respected, and held in high regard by them.

"To dominate his fellows, to be superior to them; from this springs the competitive spirit.

"To submit to something, a man or an idea, that he considers to be greater than himself; the inclination to subordinate himself to an ideal.

"To create, to accomplish something, to be constructive, and to see the product of his efforts before him.

"To satisfy his curiosity once aroused; to understand and learn about those things around him."

The systems man can be fairly certain that some operating employees will be fearful of change the moment he appears on the scene. A change to the insecure individual is feared because he feels that he may be incapable of adjustment to the change. Thus, he fears he may be thrown out of a job, or at least he may have to go through a long and uncomfortable learning or re-adjustment period. At the same time, the methods man knows that most employees have certain drives or instincts which will actually aid in his work. They may be encouraged to cooperate in a change for the following reasons:

A willingness to go along with others who have already indicated a desire to cooperate.

A desire to master the new procedure or system before fellow workers can acquire the same degree of skill or speed.

A desire to satisfy his curiosity for understanding the proposed new procedure, once he is convinced that his supervisor and at least some of the group around him are going to accept it.

The creative interest of assisting the systems man in his current project by offering personal ideas or suggestions to improve the methods already in use. It is especially important that the systems man always invite the operating employee to contribute his ideas to any improvement in routine or system. When no concrete ideas are forthcoming, at least the employee should be able to voice acceptance and approval of the new development.

The foregoing instincts are perhaps more those of the well-balanced person, than those of the emotionally unstable individual. I have come to look for the following signs generally as an expression of a well-adjusted worker:

A willingness to answer questions and offer information in a calm, friendly manner, rather than in a defensive or questioning way; no suggestion of undue nervousness or strain in the voice; no desire

to postpone the interview by giving as an excuse an excessive amount of urgent work; outlining his duties in a factual, rather than a boastful manner, and without undue emphasis on the great importance of or particular qualifications for a certain job; outward signs of personal neatness and orderliness of his workplace; and the quality of his current work.

Since individuals are largely dominated by the habits they have developed, it gives them comfort to carry out the skills or tasks best developed. These acts can be performed without much conscious effort, and emotional disturbances sometimes appear when habituated acts are changed. For a number of years one of my clients had a machine operator who could turn out at least a third more payroll work on a particular type of mechanical equipment than any other person I had ever observed on a like operation. Each time I watched her at work I marveled at her rhythm and speed but felt increasing concern over the great personal tension which accompanied her work and general attitude. She was a "lone wolf" in that she did not share the companionship of the other women in the office, either while on the job or in outside social contacts. Sometimes she would come to work and give everyone, including her supervisor, the "silence treatment" for a full day. Later she would explain, perhaps, that she had had a quarrel with her husband and therefore was speaking to no one.

Emotional block

In due course a new and improved machine was installed for the payroll work, and immediately trouble ensued. The operator, who had been phenominally proficient on the old machine, had to struggle to achieve even the speed of the relief operator who was functioning only at an average level. Gradually her speed built up but at no time did she even try to exceed the normal range of performance for the particular job.

At the office she referred constantly to her marital difficulties, and without question they had some effect upon her work. Nevertheless, when she left the job, her reason for leaving was that her husband had rejoined the Army and she was following him to his new post. I hope she has found greater happiness and peace of mind there, because she certainly did not have it formerly.

Various educators and psychologists explain that when habits become associated with an emotional tone, they become more difficult and dangerous to change. On the other hand, with most fairly well adjusted persons habits may be changed without a feeling of resentment, provided the change is gradual or is accompanied by an acceptable explanation as to why the new method or procedure will relieve effort or accomplish a better result. As a rule persons who have relatively less stability or little education resent change more than those of fairly good emotional adjustment or higher educational development.

While the staff systems man can usually do little about maladjusted employees in operating assignments, the outside consultant can often bring such misfits to the attention of management. As a matter of fact, in some cases if he does not bring such conditions to light, his system project may actually be in danger of failure or unnecessary delay.

In general, the systems man comes into direct contact with the line employee—first, at the time of gathering data for analysis and decision; second, at the time of training and installation. In all of his contacts he must make clear, by every word and action, that his mission is a helpful and not a destructive one. Often he can make clear that his assignment is to assist the worker in turning out the necessary work volume with less fatigue or without overtime. His further mission is to inspect and alleviate, through executive decision based upon his reports, working conditions that are not conducive to effective performance or to the health and comfort of the employee.

The omniscient systems man

The line employee generally becomes his active ally when he finds the systems man evaluating the lighting, ventilating, noise disturbing, motion distracting and other physical conditions of the workplace. The systems man must also look to the posture of the worker and to the conditions of seating, the desk, mechanical equipment and other facilities or tools of the worker. Dr. Alexander Leighton, writing in the January, 1951, issue of *Personnel* says, "If people won't work—and sometimes they will not—it probably indicates that the conditions of work are abnormal. There is something wrong with the job, not with the man. Management, instead of cussing the help, would do better to concentrate on finding out what the abnormal conditions are and remedying them."

The systems man in evaluating not only the procedure to be followed but also all of the working conditions of the line employee, is carrying out this fundamental suggestion of Dr. Leighton. When the worker begins to realize that all of these things are considered by the analyst, when the worker comes to understand that his own opinion is valued and embraced in the proposal, he becomes a cooperating link in the methods project.

After a decision is made to inaugurate a methods change or a new procedure, it is usually the job of the methods analyst to be at the shoulder of the operating supervisor during the installation period. During this period it is most important to spot and solve with dispatch the minute, but often frequent, problems of readjustment. When these are handled with patience and self-confidence by the systems man, both the line supervisor and his workers can usually be relied upon to lend full support gladly and to push the change quickly to a successful completion. Follow-up is the final step.

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Dictating Equipment—
Stenographic Pool or Otherwise

By J. U. Witt

IT has been stated that the development of the business machine industry is an evolution and not a revolution. Perhaps this statement can best be explained by the fact that, in an ever-increasing number of cases, the one-time office secretary, is rapidly being supplanted by a robot, in the form of a piece of electrical equipment known as Televoice or Telecord.

Those of us who in earlier years instituted the use of the stenographic pool with its related typing and transcribing equipment, are in many cases faced with replacement of that equipment for it is now, by comparison, rather crude in design and application, and certainly if we are to obtain increase in return on the payroll dollar, we must consider taking advantage of the most modern of machine methods.

It is our impression that mechanical letter writing or use of dictating machines did not receive large acceptance, even under the best of operating conditions, prior to the development of electronic equipment. Acoustical dictating equipment actually developed a lot of complexes among individuals who used them. Those in office management who have recognized the significant values of the stenographic pool have, in many cases, had the responsibility of reselling its methods and services in opposition to the prejudices of the individual letter writers from management through subordinate office levels.

With emphasis on economy in making the capital investment and pointing toward a greater utilization of the existing stenographic pool, our most recent study was applied to the replacement of obsolete acoustical machines in our San Franciso accounting office of a 110 employees. Of this group, some twelve people had intermittent need for letter writing equipment. Two typists were employed to handle transcription and statistical typing.

To obtain maximum use of the dictating machines, they had been placed at four convenient locations available to those who needed them. Record type cylinders were delivered to and from the mail room where they were shaved. Mail clerks delivered dictated records and related correspondence to the typists.

With some prior experience in the use of electronic dictating machines, which were adapted to the acoustical transcribers already in use, and understanding the value of such equipment by comparison, it was logical to assume we should buy electronic equipment. Replacement of the transcribers would largely be contingent on the make or manufacturer of the machines finally selected whether we continued use of the cylinder type or changed to disc, belt, wire, or tape. Transcribers usually receive maximum usage within the well organized stenographic pool and return on investment is entirely adequate regardless of type.

We doubt that there is a great deal of difference in operating costs and maintenance although each manufacturer has his selling advantages whether cylinder, discs, wire, tape or belt type of equipment.

Actually when we were confronted with an investment in at least four dictating machines and one or two transcribers estimated to cost approximately $2500, the continued use of cylinder records reminded us of the investment in shaver maintenance, the problem of keeping the dictating machines supplied with records, transportation of records and files to the typist, etc. appeared a practice extremely dated in this machine age. Our answer then was replacement with disc, belt or wire recording equipment.

At this time, one of our leading manufacturers, and incidentally, the vendor of our obsolete acoustical equipment, was projecting the telephonic hook-up of a single dictating machine to several dictating stations. Installations to date had been experimental. We were approached with a proposal that an installation be made under a temporary rental agreement until the value had been proven, with 75 per cent of the rental cost to apply against the purchase price if the installation was successful at the conclusion of a fair trial.

We accepted the offer by installing six dictating stations, one disc recording machine, one transcriber plus telephone instruments and wiring to the several stations.

The obvious questions came to mind—would the use of a single recording machine impede the flow of dictation from any one station? How would the transcription operator function without direct access to files and related information? How could we handle rush correspondence? How about marking corrections and changing records on the dictating machine during operator's relief. We are frank in saying that some of these questions were not answered or at least we were not firmly convinced until we had obtained the actual experience.

Surprising as it may seem, the six dictating stations provided available time sufficient that if need be, to increase the stations half again, however, it is questionable

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that a single typist or transcription operator could carry the entire work load but it would eliminate the additional purchase of the conventional dictating equipment.

The flow of finished material proceeds without interruption, obtaining maximum utilization of typing time with the greatest degree of accuracy and little interruption. The record changing signal is precise, and the operation simple.

Maintenance has come in for a large saving. Two machines to service where we had seven before (four recording, two transcribing, and one record shaver).

Needless to state, our experience after a trial period resulted in the purchase of the equipment at a cost of $1725 and due to the consolidation of work, we reduced one stenographer. We feel about 50 per cent of the reduction can be credited to the modernization of the equipment and the balance to re-organizing the work made possible through the use of the equipment.

In addition, we have reduced the maintenance cost of our machines by $40 per month, based on the fact that we now pay service on two machines and six stations as compared to four dictating machines and two transcribers under the old set-up. We now have additional installations.

Management's interest you say? The present installation paid for itself the first year. Voluntary or otherwise, we have quite a few visitors these days making inquiries as to the success of the experiment. Personally, we wouldn't have it any other way.

What the Systems Man Can Give

(*Continued from Page 16*)

the basic analyses, controls and standards which will normally result from the programs enumerated. In this phase the emphasis is placed upon getting over-all problems solved and obtaining agreement to key standards on the part of the organization as a whole. During this period organization and procedures manuals are written, specific applications for office equipment are determined and continuing cooperation between the special staff and all levels of management is achieved. It is not uncommon for this phase to require several years to complete.

Following the forming of this broad foundation comes phase seven wherein further and more detailed refinements of analysis, control and standards, including the measurement of office production are made. Here the emphasis is upon process analysis and on finecombing in greater detail all office operations for minor although significant improvements which were not made during the previous phase. Here again several years may be required in a large organization to complete the refinements.

Finally, the special staff is ready for phase eight, which is continuing in nature. It may be characterized as the follow-up or evaluation stage, wherein office operations are again reviewed in terms of changing conditions and the possibility of further improvements made possible by the results of current research. Top management expects that we will possess and exercise an ability to deal with others with a minimum of friction and at all times in a spirit of objectivity. In short, top management expects that its methods man be both technician and salesman.

Policy Formulation

(*Continued from Page 20*)

Policy should be a sincere expression of the management's philosophy. Management should not say something and do something else. Policy should not represent the views of certain factions within the management group. It is better to defer the formulation of a particular policy than to issue a statement which does not represent the views of all or at least a substantial majority of the management group. Management must have the courage and the intellectual honesty to live up to the policies it promulgated even in the face of unpleasant developments. A management which is not prepared to face the consequences of its own policies is weak.

Policy should be adhered to, and management must have the courage to see that its policies are followed. Nothing can do more to destroy confidence in management than for individuals down the line to feel that its management will not take a firm position in seeing that policy is enforced. Management should be firm, but not dictatorial. This in itself is an excellent reflection of corporate character and principle.

Policy formulation should permit executives to delegate authority and responsibility and at the same time establish such controls as may be necessary to insure satisfactory results at all levels of operation. Sound policies should free executives from detail and day-to-day decisions which could be handled by others, thus conserving executive time.

Conclusion

Many organizations have sound policies and procedures. Because of their foresight they are in a very fortunate position. Other organizations almost disregard policy and procedures. They pass it off as a new fangled idea. They get by without it, so why bother. Maybe the good times have been a factor in keeping them in business. As systems men we may have our fingers crossed.

But the large majority of organizations not only recognize the desirability of written policies and procedures, but are anxious to do something about it. Any management which desires to improve its policies and procedures should consider several things.

1. Management must recognize the full significance of the undertaking. Its implications are broad and far reaching. Management should *know what* it wants to do.

2. Management should determine the basic goals it seeks to reach, as well as the best approach for reaching them. It must have the necessary *know how.*
3. There should be a genuine *desire* on the part of management to develop and follow through on such a program. It must do much more than pay lip service to such an undertaking. Management must create the proper atmosphere which motivates its people to do a better job.
4. The entire organization can and should *participate* in the formulation of policy and procedure. Participation should be real and genuine.

As systems men such a program presents both a challenge and an opportunity. An opportunity to take a more active part in our management. An opportunity to provide a real management service to our key line and staff officials. An opportunity to do a bang-up job. Let us accept this challenge, and do the job well.

Job Shop Operation

(*Continued from Page 7*)

c) Transparent colored signals are placed alongside the total estimated time on machine number, behind which they are filed.

d) Complete sets of forms are filed for each job, behind machine load card until released for production.

The productive material requisition is a notice of raw material delivery, issued to material stores, to release specific material in specific quantities, at a definite time to the shop and machine, and/or department where the first operation is performed. These requisitions should be filed in a visible file.

Productive material requisitions: a) identify where material requisitions go, b) are filed according to due dates, c) provide description of material, d) assign correct material to job, e) give shop order number, and g) tell where to deliver material.

The *move ticket* is an identification form which indicates the sequence of operations in the processing of a job from raw material stores to the shipping department. Sometimes move tickets are used and issued by foreman as tote tickets, releasing jobs or parts of jobs from department to department. Move tickets act as a mechanical expeditor and identify all material in process.

Move tickets: a) identify material, quantity, part number, etc., of work in process, b) can be run on card stock and wired to container or material, c) tell sequence of operations, and d) indicate where job is to move next.

The *tool notice* is issued to the tool crib and identifies the tools by blueprint number with cross index files on tool for part number so and so. Notices should be filed in a visible file. Tool notices are filed according to due dates, list blueprint which specifies tools to be used, and identify the department to receive tools.

The *shipping order* is a notice of information issued to the shipping department to ship specific quantities of specific parts on a definite date, to a particular customer. This order usually carries shipping instructions. They should be filed in a visible file.

a) File by due dates and customer's name.
b) Quantity given.
c) Part number, description of material and weight and quantity shipped.
d) Column provided to record partial shipments. Some organizations will need more space and will use extra card.
e) Customer's name and address.
f) Shipping instructions.
g) Ship to —
h) Recording shipping date.

It is not necessary for you to know the answers to all types of shop order writing and production control methods. Just keep in mind that material and paper work must flow together. Paper work reports the progress and results of the job moving through the shop. Where a shop doesn't use *paper work* they control production operations by rule of thumb method and this is very costly and inefficient in most cases.

Most manufacturing firms are a combination job shop and straight line shop. There are fluctuations in quantities of orders and materials being issued day in and day out to manufacturers. This condition will continue and become more prominent as we move to expanded operations. Most executives are on the fence and would like to have information about what manufacturing facilities are available and what the work load is from day to day and week to week.

The Human Problem

(*Continued from Page 23*)

In conclusion, let me emphasize that intelligence and proper technical knowledge are most important to the work of the systems man. However, even more important and fundamental are his own emotional adjustments and his desire to serve the people around him without fuss and fanfare. His is a staff job and his work can succeed and endure best if he stays out of the limelight, giving all possible credit to the operating personnel. His own success can be measured best by the success of others in applying procedure changes.

From systems work comes inspiration, humility and love of service to fellowmen. Without the human touch, the best of technicians is lost.

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Baldwin-Lima-Hamilton Corp.
Philadelphia

FRANK HOFFMAN
Standard Oil Co. (N. J.)
New York

H. KENNETH MARKS
Marks-Adams Co.
New York